

[SPECIFICATION]

[TITLE OF THE INVENTION]

Construction of tub cover of full automatic washing machine

[BRIEF DESCRIPTION OF THE DRAWINGS]

FIG. 1 is a sectional view of a related art washing machine;

FIG. 2 is an enlarged sectional view illustrating a tub cover of a related art washing machine;

FIG. 3 is a sectional view illustrating a construction of a washing machine in accordance with the present invention;

FIG. 4 is a dissembled perspective view illustrating a construction of a tub cover in accordance with the present invention;

FIG. 5 is an enlarged sectional view illustrating a tub cover being coupled to a washing machine in accordance with the present invention;

FIG. 6 is a diagram illustrating upper and lower tub covers and a guide rib being united to each other in accordance with the first embodiment of the present invention;

FIG. 7 is a diagram illustrating upper and lower tub covers and a guide rib being united to each other in accordance with the second embodiment of the present invention;

FIG. 8 is a diagram illustrating upper and lower tub covers and a guide rib being united to each other in accordance with the third embodiment of the present invention;

FIG. 9 is a diagram illustrating upper and lower tub covers and a guide rib being united to each other in accordance with the fourth embodiment of the present invention;

FIG. 10 is a diagram illustrating upper and lower tub covers and a guide rib being united to each other in accordance with the fifth embodiment of the present invention;

FIG. 11 is a diagram illustrating upper and lower tub covers and a guide rib being united to each other in accordance with the sixth embodiment of the present invention;

FIG. 12 is a bottom view of FIG. 11;

FIG. 13 is a diagram illustrating upper and lower tub covers and a guide rib being united to each other in accordance with the seventh embodiment of the present invention;

FIG. 14 is a bottom view of FIG. 13;

FIG. 15 is a diagram illustrating upper and lower tub covers and a guide rib being united to each other in accordance with the eighth embodiment of the present invention;

FIG. 16 is a diagram illustrating upper and lower tub covers and a guide rib being united to each other in accordance with the ninth embodiment of the present invention; and

FIGS. 17A and 17B are diagrams illustrating a change of an end of an upper tub cover in accordance with the present invention.

- Description of reference numerals for main parts in the drawings.

101: washing machine

102: outer tub

103: inner tub

104: fluid balancer

105: chamfer

106: driving shaft

107: motor

111: lower tub cover

112: inner rounding face

113: fore end

114: through hole

115: flow passage

116: discharge outlet

121: upper tub cover

122: outer rounding face

123: fore end

131: guide rib

132: stepped part

133: screw hole

134: screw

[DETAILED DESCRIPTION OF THE INVENTION]

[OBJECT OF THE INVENTION]

[FIELD OF THE INVENTION AND DISCUSSION OF THE RELATED ART]

The present invention relates to a tub cover of a full automatic washing machine, and more particularly, to the tub cover in which the tub cover has an inner rounding face on a lower tub cover, the inner rounding face for guiding washing water going up to the interval of inner and outer tubs by a centrifugal force so as to improve the pumping efficiency by providing the washing water to the outer part of the inner tub and also has an inner rounding face on an upper tub cover, the inner rounding face for preventing the washing water from splashing out of the outer tub.

FIG. 1 is a sectional view of a related art pulsator washing machine based on an agitation type. The washing machine 1 includes an outer tub 2, an inner tub 3, a pulsator 4, a washing shaft 6, a dewatering shaft 6-1, a clutch 7, a motor 8, and a drain valve 9. The outer tub 2 is for storing washing water. The inner tub 3 is installed inside the outer tub 2 for washing laundry. The pulsator 4 is installed on the inner bottom face of the inner tub 3 for performing the agitation washing process by providing a mechanical rotating force to the laundry by rotating in regular and reverse directions. The washing shaft 6 is coupled to the pulsator 4 for rotating the pulsator 4 in the regular and reverse directions. The dewatering shaft 6-1 is coupled to the inner tub 3 for rotating the inner tub in one direction. The clutch 7 couples the washing shaft 6 with the dewatering shaft 6-1 or separates them from each other.

The motor 8 is connected to the clutch 7 by a belt and delivers the rotating force to drive the clutch 7. The drain valve 9 is coupled to the outer tub 2 to discharge the washing water in the outer tub 2 out of the washing machine.

An operation of the related art washing machine will be described below.

First, laundry is put into an inner tub 3 of a washing machine and washing water is provided when a start button is pressed. When more than a certain amount of washing water is provided into the inner and outer tubs 3 and 2, water supply is stopped by a sensor.

At the same time as the water supply is stopped, the motor 8 rotates in regular and reverse directions to rotate the washing shaft 6 in regular and reverse directions as well.

Accordingly, the pulsator 4 being connected to the washing shaft 6 is rotated in both regular and reverse directions, thereby performing the washing process.

When the washing process is completed, the drain valve 9 is opened to drain the washing water in the outer tub 2, thereby performing the draining process.

To perform the dewatering process after the draining process is completed, the inner tub 3 and the pulsator 4 rapidly rotate together in one direction in a state that the washing shaft 6 and the dewatering shaft 6-1 are coupled with each other. In this way, the washing water in the inner tub 3 is drained to the outer tub 2 through a plurality of washing holes 5 and the washing water drained to the outer tub 2 is drained out of the washing machine through the drain valve 10.

In the related art washing machine, however, as the washing process is performed by the agitation caused by the regular and reverse rotations of the pulsator, damage to and entangling of the laundry inevitably comes to occur.

Also, because a lot of washing water need to be provided to the outer tub 2 to wash and rinse the laundry, the amount of the washing water and detergent and time for supplying and draining washing water are increased.

[TECHNICAL TASKS TO BE ACHIEVED BY THE INVENTION]

Accordingly, the present invention is directed to a tub cover of a full automatic washing machine that substantially obviates one or more of the problems due to limitations and disadvantages of the related art.

An object of the present invention is to provide a tub cover of a full automatic washing machine that has an excellent pumping efficiency as washing water going up to the interval of inner and outer tubs is smoothly guided by upper and lower tub covers and has a better washing efficiency as washing water provided to the inner tub goes to the outer part of the inner tub and prevented from splashing out of the outer tub.

Additional advantages, objects, and features of the invention will be set forth in part in the description which follows and in part will become apparent to those having ordinary skill in the art upon examination of the following or may be learned from practice of the invention. The objectives and other advantages of the invention may be realized and attained by the structure particularly pointed out in the written description and claims hereof as well as the appended drawings.

To achieve these objects and other advantages and in accordance with the purpose of the invention, as embodied and broadly described herein, a tub cover of a full automatic washing machine includes an inner rounding face for guiding washing water of a lower tub cover, an outer rounding face being formed on an upper cover for preventing the washing water from splashing out of the washing machine, and a guide rib being formed between the inner and outer rounding faces for forming a flow passage to which the washing water is provided.

It is to be understood that both the foregoing general description and the following detailed description of the present invention are exemplary and explanatory and are intended to provide further explanation of the invention as claimed.

[PREFERRED EMBODIMENTS OF THE INVENTION]

A construction of the present invention will be described with reference to FIGs. 3 to 15.

The tub cover of a full automatic washing machine includes an inner rounding face, an outer rounding face, a plurality of guide ribs, and a fastening means. The inner rounding face guides washing water of a lower tub cover. The outer rounding face is formed on an upper cover for preventing the washing water from splashing out of the washing machine. A plurality of the guide rib are formed between the inner and outer rounding faces for forming a flow passage to which the washing water is provided.

To fabricate the fastening means, the upper and lower tub covers 121 and 111 and the guide rib 131 are separately formed and then welded to each other.

Alternatively, to fabricate the fastening means, the upper tub cover 121 and the guide rib 131 are integrally formed, to which the lower tub cover 111 separately formed is welded.

Alternatively, to fabricate the fastening means, the lower tub cover 111 and the guide rib 131 are integrally formed, to which the upper tub cover 121 separately formed is welded.

The fastening means includes a plurality of screw holes 133, a plurality of through holes 114, and a plurality of screws 134. The screw holes 133 are formed on the guide rib 131 being integrally formed with the upper tub cover 121. The through holes 114 are formed on the lower tub cover 111, in a way to be accord with the screw holes 133. The screws 134 are inserted to the through holes 114 and welded to the screw holes 133.

The guide ribs 131 which are extended to a fore end of the upper and lower tub covers 121 and 111 are also provided for guiding the washing water to a discharge outlet 116 being formed by the upper and lower tub covers 121 and 111.

The guide ribs 131 which are extended to the middle of a flow passage 115 of the upper and lower tub covers 121 and 111 are also provided for providing the washing water to

the middle of the flow passage 115 being formed by the upper and lower tub covers 121 and 111 and for mixing it.

Also, a stepped part 132 being formed on the guide rib 131 is additionally provided for preventing the upper tub cover 121 from protruding to the outer side.

The length of the fore end of the outer rounding face 122 of the upper tub cover 121 is formed to be same as the length L1 of the fore end of the inner rounding face 112 of the lower tub cover 111.

Alternatively, the length L2 of the fore end of the outer rounding face 122 of the upper tub cover 121 is formed to be shorter than the length L1 of the fore end of the inner rounding face 112 of the lower tub cover 111.

Alternatively, the length L4 of the fore end of the outer rounding face 122 of the upper tub cover 121 is formed to be longer than the length L1 of the fore end of the inner rounding face 112 of the lower tub cover 111.

The angle of the fore end 123 of the outer rounding face 122 of the upper tub cover 121 is horizontally changed to adjust the width S of the discharge outlet 116 to which the washing water is discharged.

Alternatively, the width S of the discharge outlet 116 to which the washing water is discharged is adjusted without changing the angle of the fore end 123 of the outer rounding face 122 of the upper tub cover 121.

The height H of the fore end 123 of the outer rounding face 122 of the upper tub cover is vertically changed to adjust the spray angle of the washing water discharged to the discharge outlet 116.

A radius R1 formed by the fore end 123 of the outer rounding face 122 of the upper tub cover 121 and a radius R2 formed by the fore 113 end of the inner rounding face 112 of the lower tub cover 111 is made different.

The lower tub cover 111 is mounted spaced from the fluid balancer 104 by a preset distance T1 to prevent bumping between the fluid balancer 104 and the lower tub cover 111.

Also, in order to prevent bumping between the fluid balancer 104 and the outer tub 102, a second gap T2 formed between the fluid balancer 104 and the outer tub 102 may be further provided. The distance T1 is preferably identical to the gap T2 between the fluid balancer 104 and the outer tub 102.

Also, a chamfer face 105 is provided to the fluid balancer 104 to prevent the bumping between the fore end 113 of the lower tub cover 111 and the fluid balancer 104 coupled to the inner tub 103.

An operation of a tub cover of a washing machine of the present invention will be described below.

First, laundry is put into an inner tub 103 of a washing machine 101. Then, washing water is provided when a start button is pressed. When more than a certain amount of washing water is provided in the inner tub 103 and an outer tub 102, water supply is stopped and the washing operation is started. The washing operation is performed by the rotation of a motor 107. That is, a driving shaft 106 is rotated in regular and reverse directions by regular and reverse rotations of the motor 107 and the inner tub 103 is rotated in regular and reverse directions by the regular and reverse rotations of the driving shaft 106.

In this way, the washing operation is performed by a water flow of the washing water, the water flow being generated by regular and reverse rotations of the inner tub 103. At this time, the number of the rotation of the motor 107 need to be increased. That is, when the number of the rotation of the motor 107 fully increases, the number of rotation of the driving shaft 106 and the inner tub 103 increase as well, thereby strengthening the centrifugal force.

Accordingly, the laundry is pushed to the inner faces of the inner tub 103 by the centrifugal force and the washing water passes through textures of the laundry. In this way,

the laundry is washed better as contaminants on the laundry is peeled off by the washing water passing through the textures of it.

The washing water which passed through the textures of the laundry is drained to the outer tub 102 through washing holes of the inner tub 103. Then, the washing water drained to the outer tub 102 goes up along the interval of the inner and outer tubs 103 and 102 by the centrifugal force generated by the rapid rotation of the inner tub 103.

As shown in FIG. 5, the washing water ascending between the inner and outer tubs 103 and 102 is provided to the interval of the lower cover 111 and the outer tub 102 and at the same time, it is discharged through the discharge outlet 116 between the lower and upper tub covers 111 and 121.

At this time, the washing water provided through the flow passage 115 is discharged to the discharge outlet 116 by being guided by the inner rounding face 112 of the lower tub cover 111.

The washing water is provided to the outer part of the inner tub 103 without being splashed out of the outer tub 102 by the outer rounding face 122 of the upper tub cover 121, thereby obtaining better washing efficiency.

A plurality of guide ribs 131 are united to the interval between the inner and lower rounding faces 112 and 122 to form a flow passage 115 for guiding the washing water.

As shown in FIG. 6, to fabricate the guide ribs 131, the upper and lower tub covers 121 and 111 and the guide rib 131 are separately made and then welded to each other.

Alternatively, to fabricate the guide ribs 131, the upper tub cover 121 and the guide rib 131 are integrally formed, to which the lower tub cover 111 separately formed is welded.

Alternatively, to fabricate the guide ribs 131, the lower cover 111 and the guide rib 131 are integrally formed, to which the upper tub cover 121 separately formed is welded.

The guide ribs include a plurality of screw holes 133, a plurality of through holes 114,

and a plurality of screws 134. The screw holes 133 are formed on the guide rib 131 being integrally formed with the upper tub cover 121. The through holes 114 are formed on the lower tub cover 111, in a way to be accord with the screw holes 133. Then, as shown in FIG. 9, they are fixed by the screws 134.

The guide ribs 131 which are extended to fore ends 123 and 113 of the upper and lower tub covers 121 and 111 are also provided for guiding the washing water to a discharge outlet 116.

As shown in FIG. 10, the washing water is guided by the guide ribs 131 which are extended to the middle of a flow passage 115 of the upper and lower tub covers 121 and 111 and mixed in the flow passage 115 to be provided to the inner tub 102.

Also, a stepped part 132 of FIG. 5 being formed on the guide rib 131 is additionally provided for preventing the upper tub cover 121 from protruding to the outer side.

Additionally, as shown in FIGs. 11 and 12, the length of the fore end of the outer rounding face 122 of the upper tub cover 121 is formed to be same as the length L1 of the fore end of the inner rounding face 112 of the lower tub cover 111. Accordingly, the washing water is perpendicularly provided to the outer part of the inner tub 103.

Alternatively, as shown in FIG. 15, the length L2 of the fore end 123 of the outer rounding face 122 of the upper tub cover 121 is formed to be shorter than the length L1 of the fore end 113 of the inner rounding face 112 of the lower tub cover 111.

Accordingly, the spray angle of the washing water being discharged to the discharge outlet 116 is adjusted.

Also, as shown in FIGs. 11 and 13, the fore end 123 of the outer rounding face 122 of the upper tub cover is horizontally changed to adjust the width S of the discharge outlet 116 to which the washing water is discharged.

That is, as shown in FIG. 11, the angle of the fore end 123 of the upper tub cover 121

is changed within a certain range S , thereby forming a curved line shown in FIG. 12. In this way, the pumping efficiency increases.

As shown in FIG. 11, the height of the fore end 123 of the outer rounding face 122 of the upper tub cover 121 is formed to be same as the height $L1$ of the fore end 113 of the lower tub cover 111. Alternatively, as shown in FIG. 15, the height $H1$ of the fore end 123 of the outer rounding face 122 of the upper tub cover 121 is formed to be higher than the height of the fore end 113 of the lower tub cover 111. Alternatively, as shown in FIG. 16, the height 2 of the fore end of the outer rounding face 122 of the upper tub cover 121 is formed to be lower than the height of the fore end 113 of the lower tub cover 111. Accordingly, the spray angle of the washing water discharged to the discharge outlet 116 is adjusted according to conditions.

That is, as shown in FIGs. 17A and 17B, the height of the fore end 113 of the upper tub cover 121 is changed centering the fore end 113 of the lower tub cover 111.

As shown in FIG. 18, a radius $R1$ formed by the fore end 123 of the outer rounding face 122 of the upper tub cover 121 and a radius $R2$ formed by the fore 113 end of the inner rounding face 112 of the lower tub cover 111 are made different to increase the washing water supply efficiency.

As shown in FIG. 5, the lower tub cover 111 is mounted spaced from the fluid balancer 104 by a preset distance $T1$ to prevent bumping between the fluid balancer 104 and the lower tub cover 111.

Also, as shown in FIG. 5, in order to prevent bumping between the fluid balancer 104 and the outer tub 102, a second gap $T2$ formed between the fluid balancer 104 and the outer tub 102 may be further provided. The distance $T1$ is preferably identical to the gap $T2$ between the fluid balancer and the outer tub.

Also, a chamfer face 105 is provided to the fluid balancer 104 to prevent the bumping

between the fore end 113 of the lower tub cover 111 and the fluid balancer 104 coupled to the inner tub 103.

[ADVANTAGE OF THE INVENTION]

A tub cover of a washing machine of the present invention includes an inner rounding face for guiding the washing water of a lower tub cover, an outer rounding face being formed on an upper cover for preventing the washing water from splashing out of the washing machine, a guide rib being formed between the inner and outer rounding faces for forming a flow passage to which the washing water is provided, and a fastening means. The washing machine of the present invention has an excellent pumping efficiency as washing water going up to the interval of inner and outer tubs is smoothly guided by upper and lower tub covers and has a better washing efficiency as washing water provided to the inner tub goes to the outer part of the inner tub and prevented from splashing out of the outer tub.